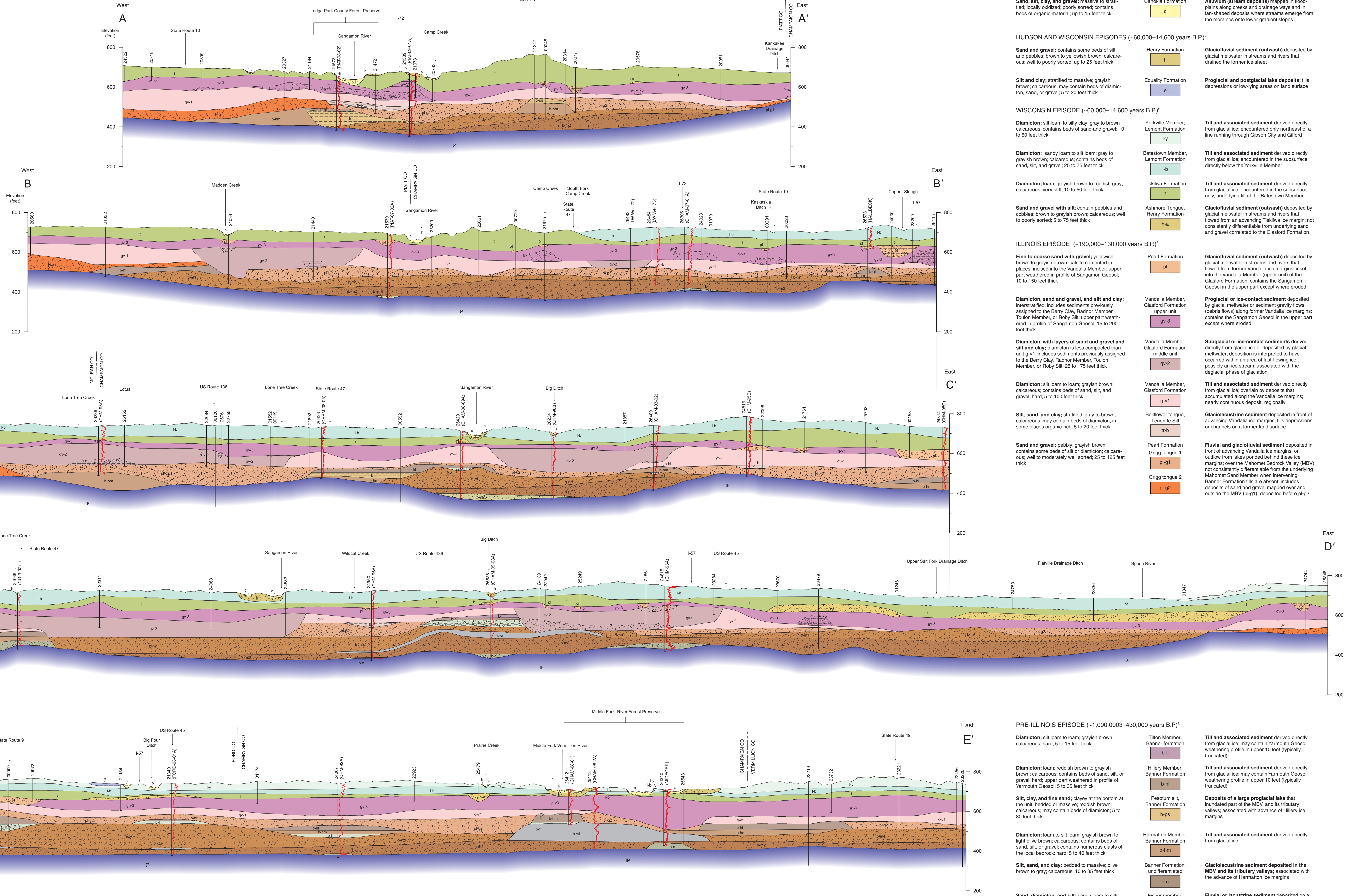
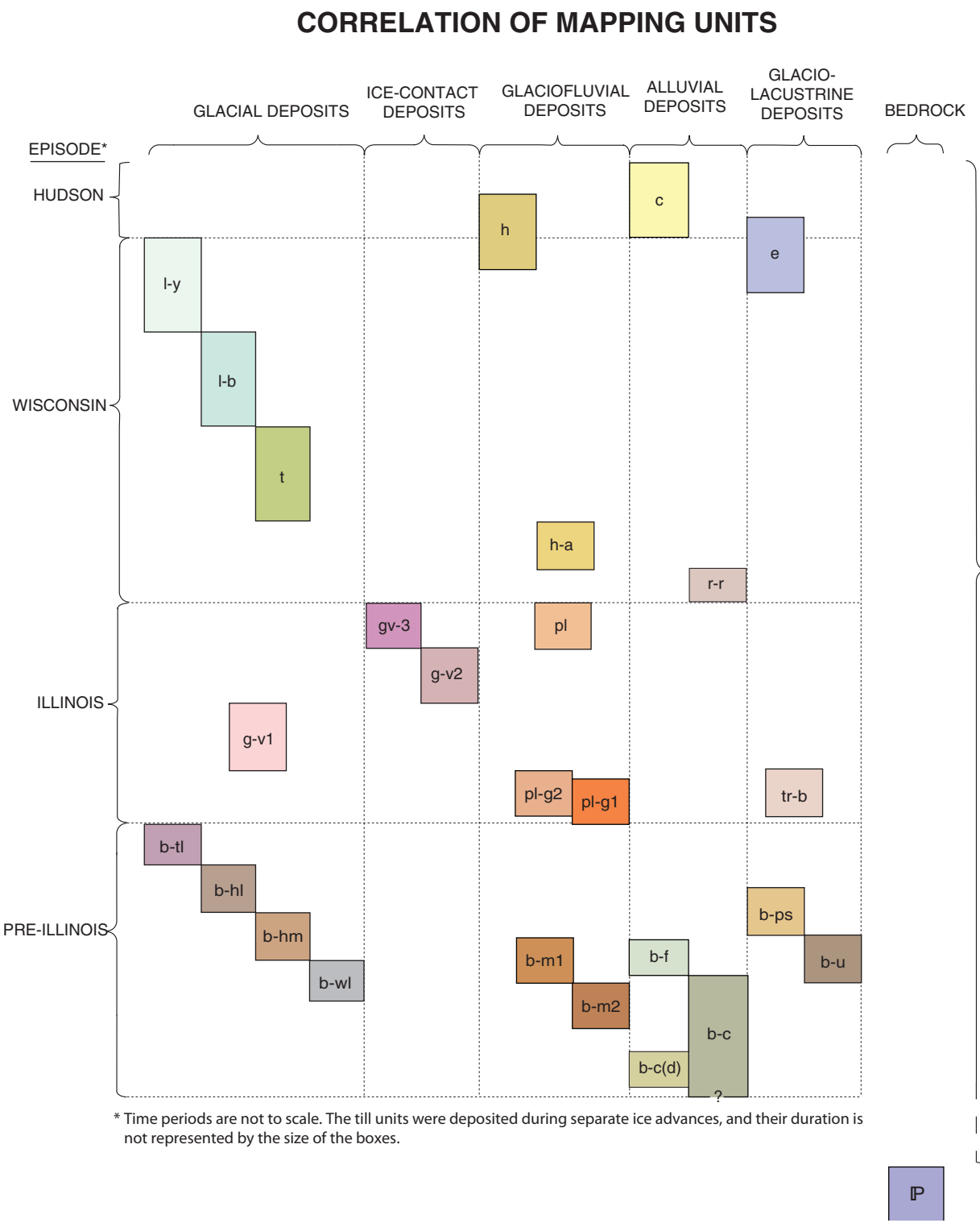


# GEOLOGIC CROSS SECTIONS OVER THE MAHOMET BEDROCK VALLEY CHAMPAIGN, FORD, VERMILION, MCLEAN, AND PIATT COUNTIES, ILLINOIS

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## INTRODUCTION

This derivative map product was developed as part of a study by the Illinois State Geological Survey to improve our understanding of the hydrogeology and geology of the Mahomet aquifer in parts of Champaign County and adjacent counties. This research was conducted between 2007 and 2009. It is also contained in a forthcoming report, Geological, Geophysical, and Hydrogeological Studies in Champaign County and Adjacent Areas that presents the results of this study.

Geologic cross sections portray unconsolidated sediments and bedrock in two-dimensions the way they would be viewed in a vertical slice through the earth's surface down to bedrock when vertically exaggerated. The cross sections provide a visual representation of the geology showing the distribution and thickness of geologic materials and how they relate to one another. The points on a cross section represent the locations of boreholes or outcrops that have logs with information about the surface and subsurface geology. The boreholes can be drilled for different purposes, including for geologic mapping, engineering testing, water wells, and oil/gas/oil exploration.

The cross sections shown crossing the Mahomet Bedrock Valley (MBV) were drawn to highlight the geologic diversity in Champaign County and adjacent areas. Each cross section depicts a much different geology that resulted from a complex and varied history of erosion and deposition. The chronology and location of events has significantly influenced the preservation or removal of older sediment.

The mapping units portrayed on the cross sections and described in the accompanying legend were defined in the geologic framework presented in Stumpf and Dey (in review). Typically, the cross sections were drawn through a series of points with straight lines. Although, geological and geophysical information from boreholes adjacent to the lines of section were used to construct these profiles where subsurface information was not available.

The geometry and extent of some geologic mapping units could not be mapped with as much certainty. These contacts are indicated by dashed lines and shown where data are less reliable or are not available. For example, the contacts of sand and gravel assigned to units g-v3 and g-v2 are delineated by

dashed lines in some places. Typically, only one or two boreholes partially or fully penetrate these units along the lines of section, and the adjacent boreholes near the line of cross section are far apart. Therefore, the lateral extent of these deposits can only be inferred by the geologist without additional geological and geophysical information.

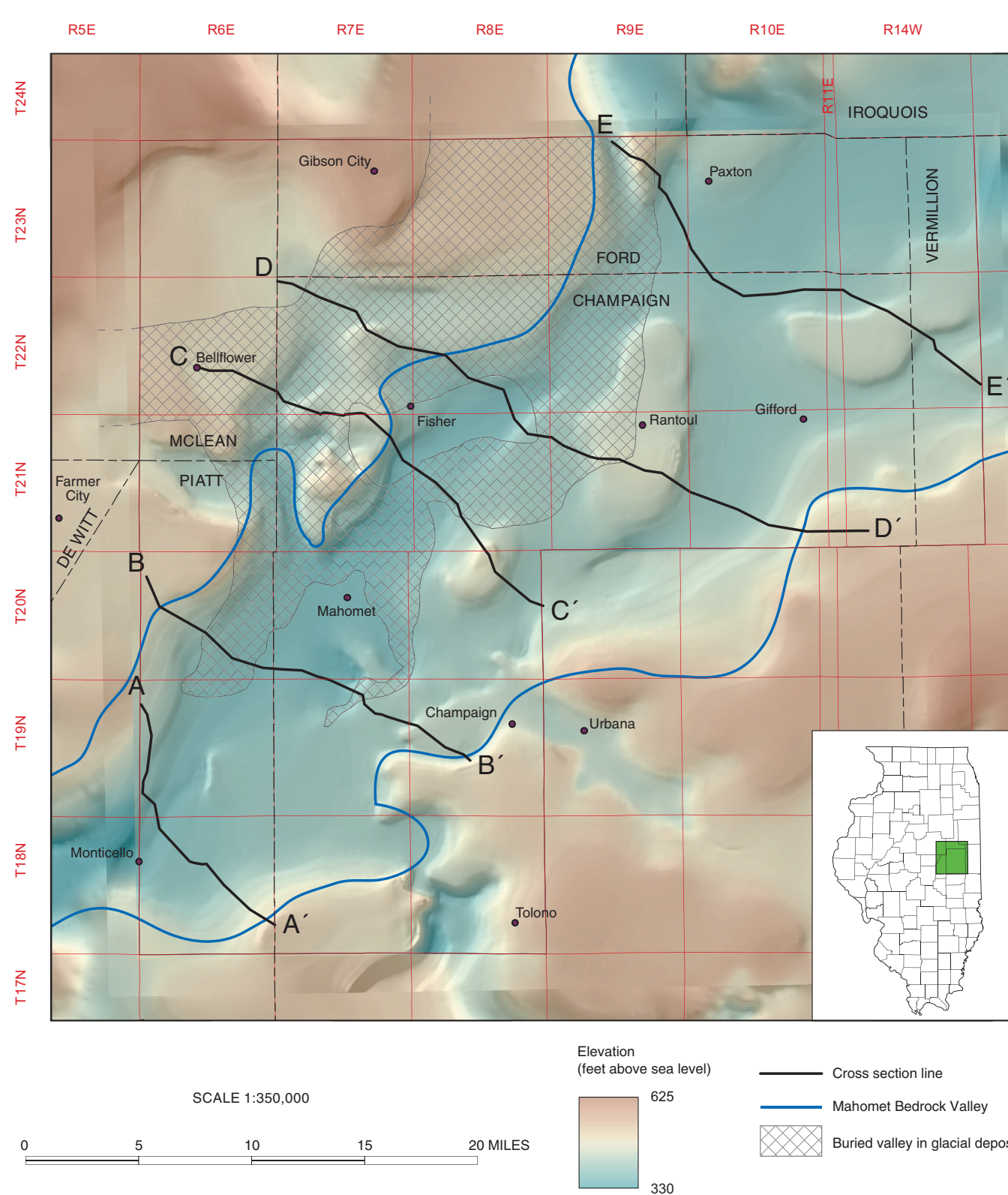
## METHODS

The cross sections were created using a combination of automated techniques in ArcMap software (version 9.3.1) developed by Environmental Systems Research Institute, Incorporated (ESRI) and manual drafting in Illustrator CS6 software developed by Adobe Systems Limited. A customized tool for the ArcMap software programmed by the ISGS (Carrell 2010) was used to generate georeferenced profiles for each raster surface grid along the line of section. The profile lines were imported to Adobe Illustrator via Avenue Systems Incorporated's MAPublisher software (version 8.4) for editing, and exported out of Adobe Illustrator as ESRI shapefiles (.shp) for further manipulation in ArcMap software.

## REFERENCES

- Bleuer, N.K., 1976, Remnant magnetism of Pleistocene sediments of Indiana: Indiana Academy of Science Proceedings, v. 85, p. 277–294.  
Carrell, J.E., 2010, Create 2D and 3D geologic cross sections: Illinois State Geological Survey. (includes user guide, tutorial data, and computer codes). URL: <http://resources.arsgis.com/gallery/files/geoprocessing/details?entryID=C83CC388-1422-2418-7F10-B4D3D5FEE6>.  
Stumpf A.J., and W.S. Dey (eds.), (in review) Understanding the Mahomet aquifer: geological, geophysical, and hydrogeological studies in Champaign County and adjacent areas. Illinois State Geological Survey, Bulletin.

**Figure 1** Location of geologic cross sections in Champaign County and adjacent areas. The cross section lines lie over a shaded relief map of the bedrock surface. The shaded relief map was developed from the bedrock topography for the project area and Illinois (Illinois State Geological Survey 1994). The boundary of glacial incision that occurred during the Illinois Episode is also shown. This valley was eroded into older deposits of the Illinois and pre-Illinois Episodes, and partially overlies the Mahomet Bedrock Valley.



## Cross Sections

- Sand and gravel
- Mainly sand; may contain some gravel or silt
- Laminated silt and clay
- Mixture of loam, sand and gravel, diamicton, and/or silty clay
- Diamicton, massive silt, or other fine-grained sediment
- Contact
- Inferred contact
- Log of natural gamma radiation

Horizontal scale: 1 inch = 4,000 feet  
Vertical scale: 1 inch = 200 feet  
Vertical exaggeration: 20X

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Location map base data from Champaign County GIS, 2013.

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The Illinois State Geological Survey and the University of Illinois make no guarantee, expressed or implied, regarding the correctness of the interpretations presented in this document and accept no liability for the consequences of decisions made by others on the basis of the information presented here. The geologic interpretations are based on data that may vary with respect to accuracy of geographic location, the type and quantity of data available at each location, and the scientific and technical qualifications of the data sources. The cross sections in this document are not meant to be enlarged.

**Recommended citation:**  
Stumpf, A.J., and L.A. Atkinson, 2014, Cross sections of the geology over the Mahomet Bedrock Valley in East-central Illinois. Illinois State Geological Survey, Illinois Map 19.

<sup>1</sup> The materials mapped at the land surface may be overlain by 1 to 5 feet of wind-dispersed silt (loess).

<sup>2</sup> The time periods for the Hudson Episode and the Wisconsin Episode are reported as calibrated radiocarbon years and can be directly compared to calendar years before 1950 (Stuiver et al. 2005).

<sup>3</sup> The subdivision of the pre-Illinois Episode is based on dates from Terrestrial Cosmogenic Nuclide (TCN) analyses conducted on quartz sand grains sampled from the upper and lower units of the Mahomet Sand Member in Piatt County (Stumpf, unpublished data).

<sup>4</sup> The West Lebanon "Till" Member was previously only mapped in western Indiana by Bleuer (1976).